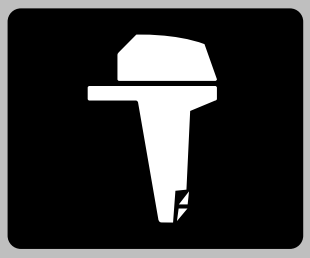
YAMAHA



F200A
FL200A

SUPPLEMENTARY SERVICE MANUAL

292087

60L-28197-3D-1X

NOTICE

This Supplementary Service Manual has been prepared to introduce new service and new data information for the F200 and FL200 which is based on the F225 and FL225. For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the following manual.

F225A, FL225A SERVICE MANUAL: 69J-28197-3D-11

Important information

Particularly important information is distinguished in this manual by the following notations:

⚠ The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

⚠ WARNING

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the outboard motor.

CAUTION:

A CAUTION indicates special precautions that must be taken to avoid damage to the outboard motor.

NOTE:

A NOTE provides key information to make procedures easier or clearer.

F200A, FL200A
SUPPLEMENTARY SERVICE MANUAL
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Wiring diagram

How to use this manual

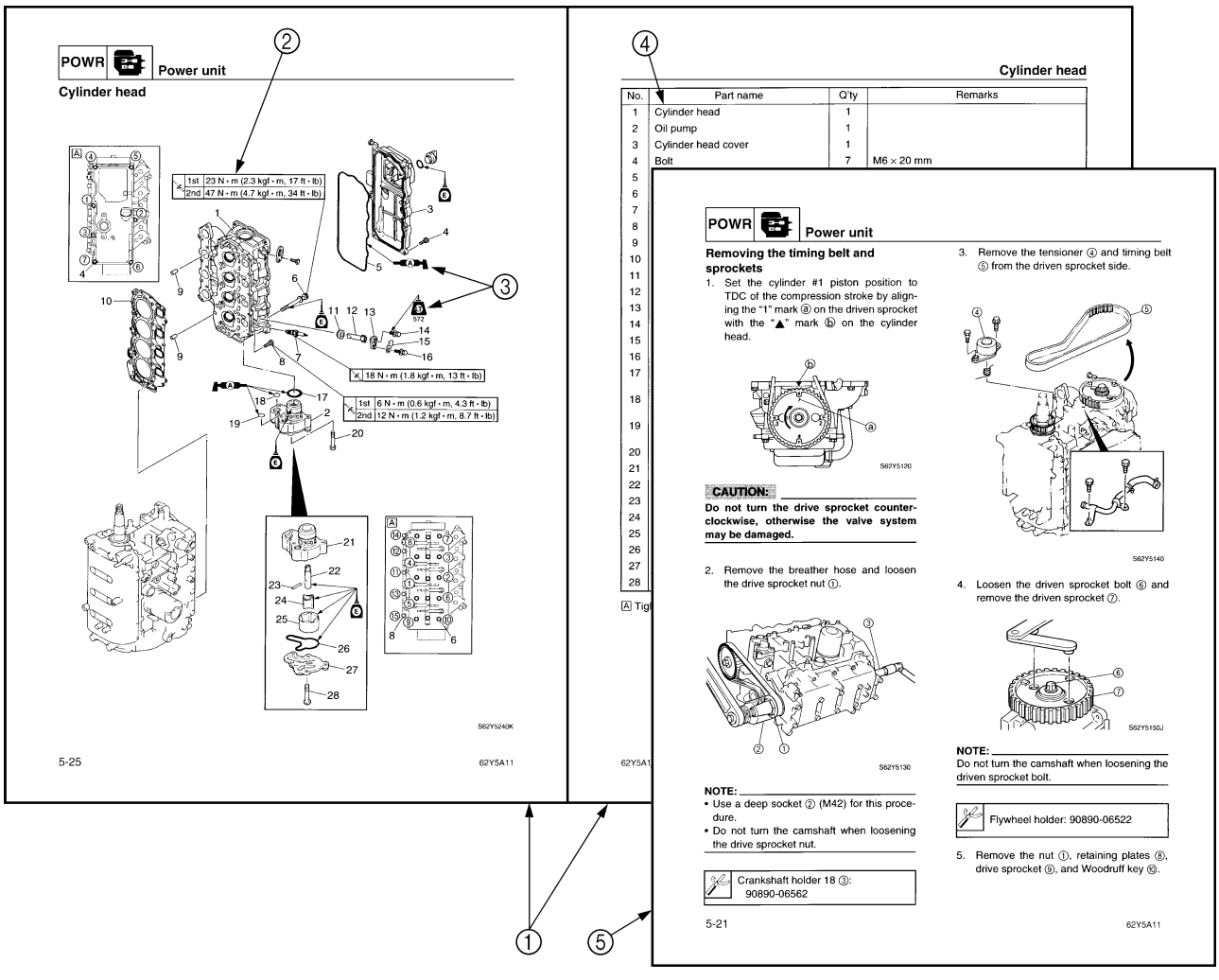
Only chapters containing revisions or additional items in the base manual have been included in this manual.

Manual format

The format of this manual has been designed to make service procedures clear and easy to understand. Use the information below as a guide for effective and quality service.

① Parts are shown and detailed in an exploded diagram and are listed in the components list.
② Tightening torque specifications are provided in the exploded diagrams and after a numbered step with tightening instructions.
③ Symbols are used to indicate important aspects of a procedure, such as the grade of lubricant and lubrication point.
④ The components list consist of parts and part quantities, as well as bolt, screw, O-ring, and hose dimensions.
⑤ Service points regarding removal, checking, and installation are shown in individual illustrations to explain the relevant procedure.

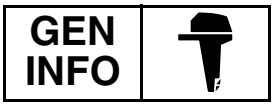
NOTE:
For troubleshooting procedures, see Chapter 9, “Troubleshooting.”



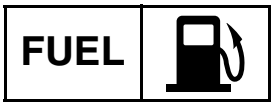
Symbols

The symbols below are designed to indicate the content of a chapter.

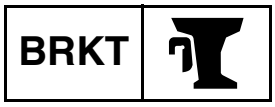
General information



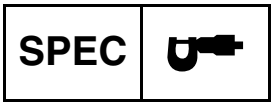
Fuel system



Bracket unit

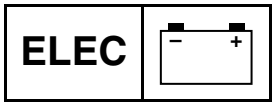


Specifications



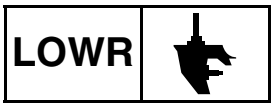
Power unit

Electrical systems

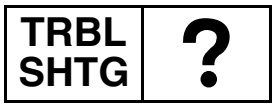


Periodic checks and adjustments

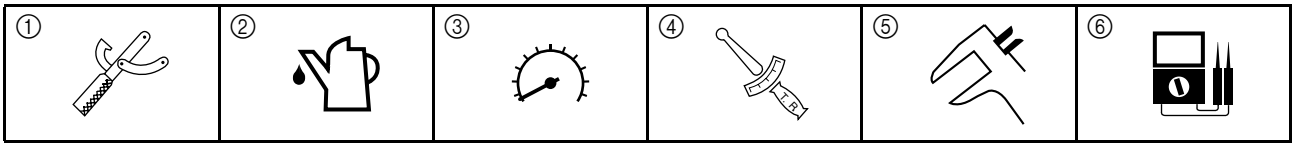
Lower unit



Troubleshooting

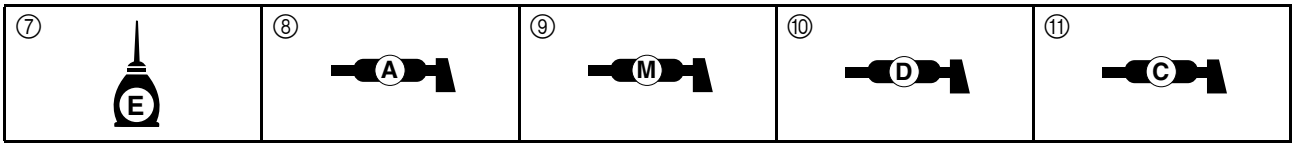


Symbols ① to ⑥ indicate specific data.



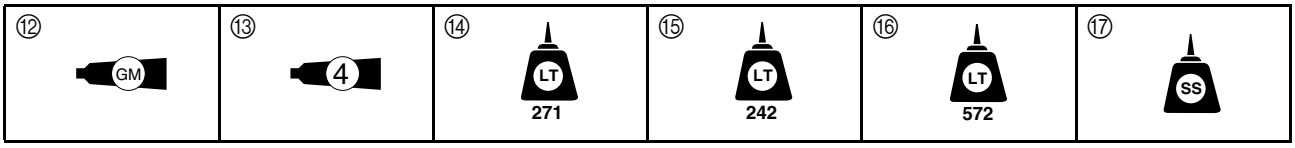
① Special tool
② Specified oil or fluid
③ Specified engine speed
④ Specified tightening torque
⑤ Specified measurement
⑥ Specified electrical value (resistance, voltage, electric current)

Symbols ⑦ to ⑪ in an exploded diagram indicate the grade of lubricant and the lubrication point.



⑦ Apply Yamaha 4-stroke motor oil
⑧ Apply water resistant grease (Yamaha grease A)
⑨ Apply molybdenum disulfide grease
⑩ Apply corrosion resistant grease (Yamaha grease D)
⑪ Apply low temperature resistant grease (Yamaha grease C)

Symbols ⑫ to ⑰ in an exploded diagram indicate the type of sealant or locking agent and the application point.



⑫ Apply Gasket Maker®
⑬ Apply Yamabond No. 4
⑭ Apply LOCTITE® No. 271 (Red)
⑮ Apply LOCTITE® No. 242 (Blue)
⑯ Apply LOCTITE® No. 572
⑰ Apply silicon sealant

Identification

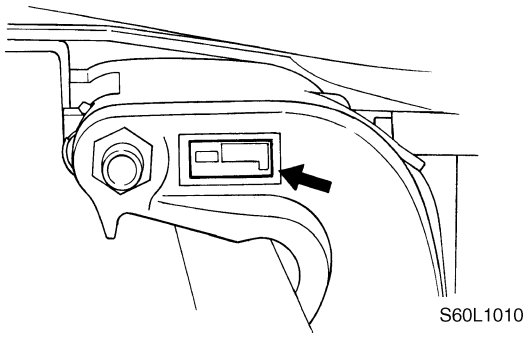
Applicable models

This manual covers the following models.

Applicable models
F200AET, FL200AET

Serial number

The outboard motor serial number is stamped on a label attached to the port clamp bracket.



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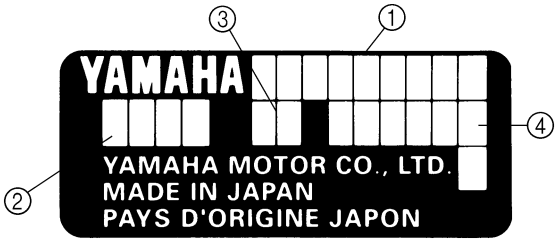


S60L1020

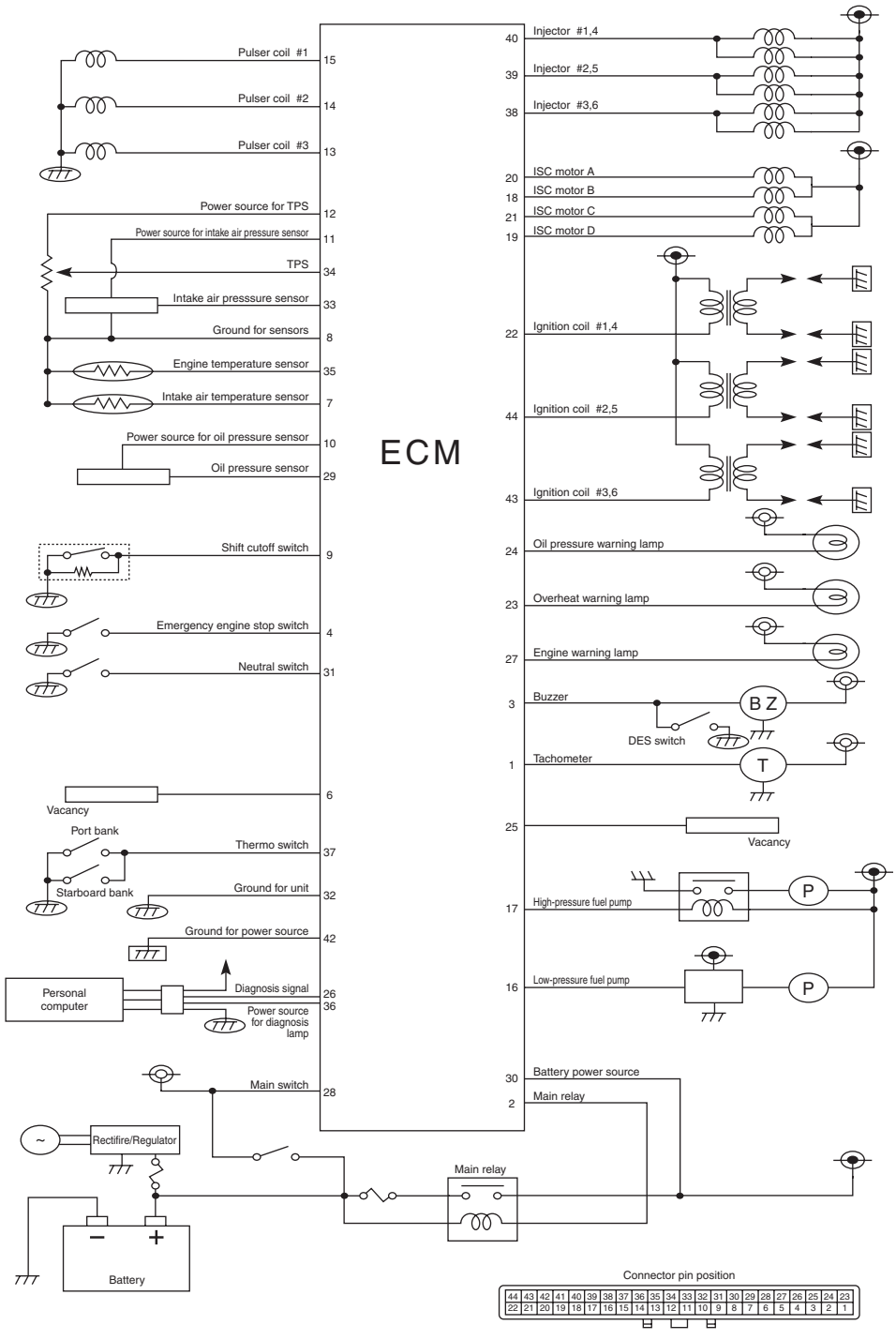
① Model name
② Approved model code
③ Transom height
④ Serial number

Model name	Approved model code	Starting serial No.
F200AET	60L	X: 600101–
FL200AET	60M	X: 600101–

Features and benefits

Electronic control system

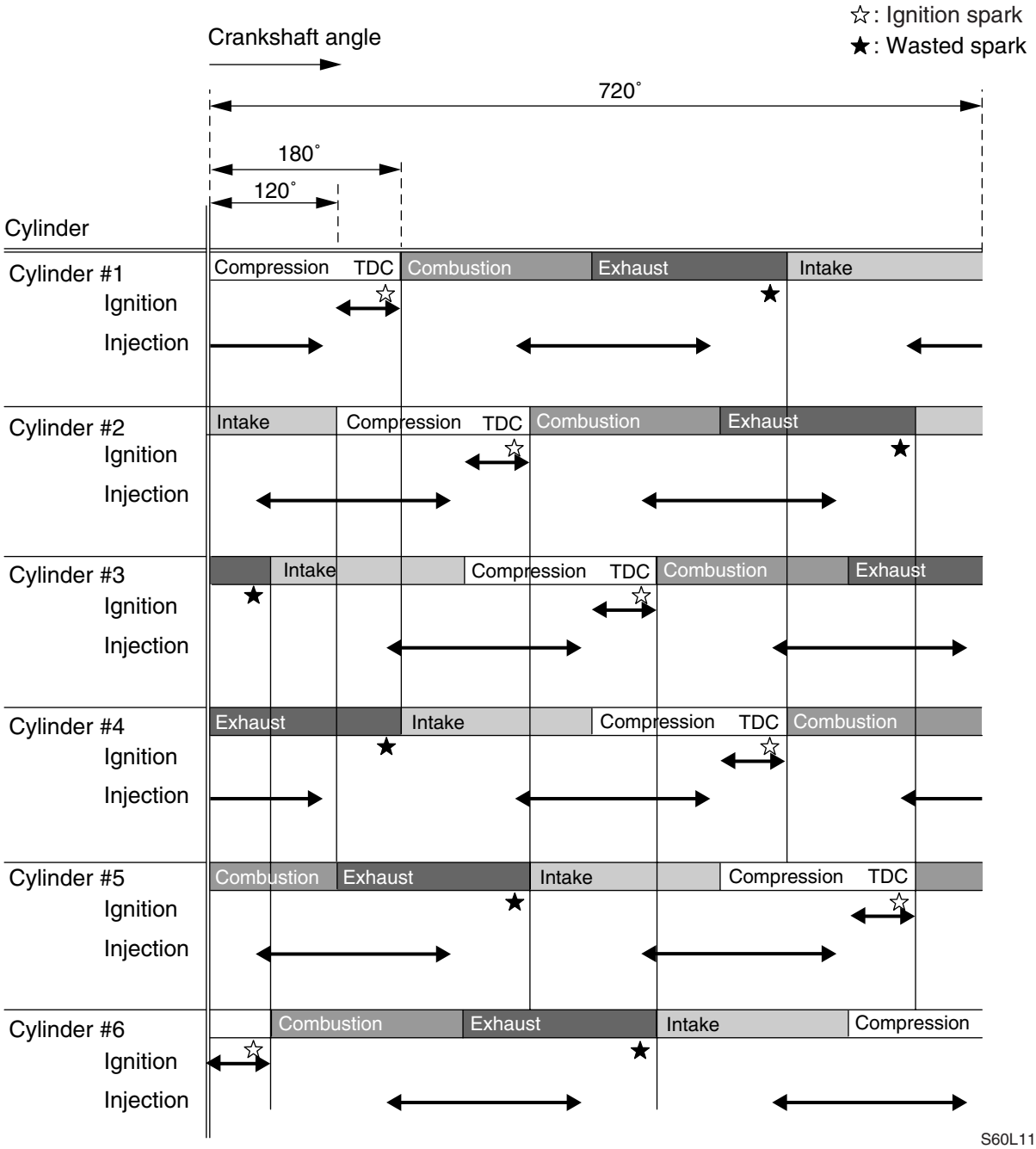
The ECM controls the ignition timing, the fuel injection timing, the fuel injection volume, and the ISC and it maintains a stoichiometric air-fuel ratio in all operating conditions, including starting and idling. Also, the ECM converts the signals from the input sensors and sends instructions to each part.



S60L1180

Ignition and fuel injection timing

This engine adopted the group injection system that the fuel required for one combustion is injected twice per one cycle.
Therefore, the injector driving circuits can be integrated to 3 circuits and a simpler electrical structure is obtained.
Firing order : #1, #2, #3, #4, #5, #6
Injection order: #1 and #4 → #2 and #5 → #3 and #6 (group injection)



S60L1190

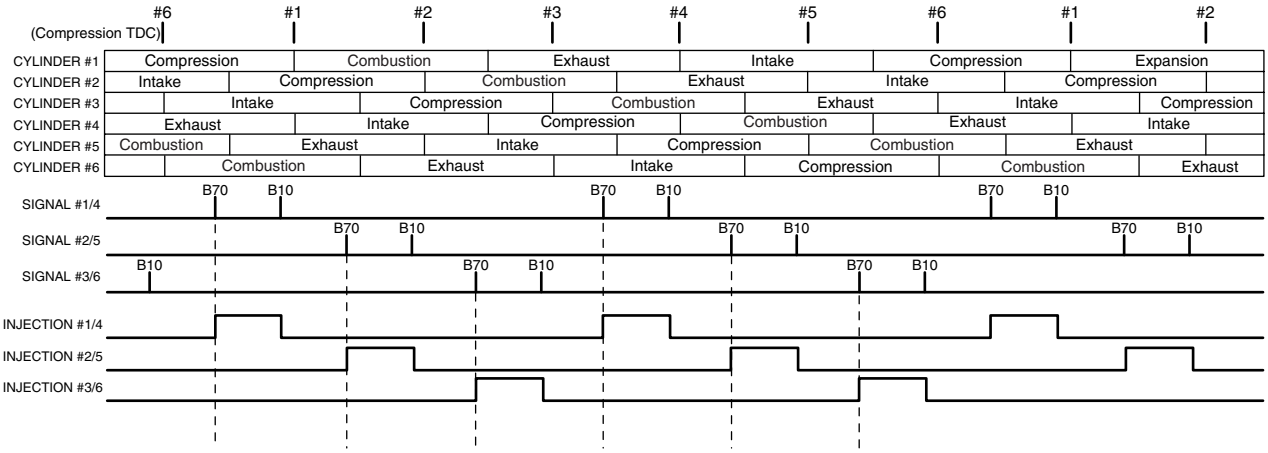
Technical tips

Fuel injection control

The F200 injects fuel simultaneously to the following cylinder pairs: #1 and #4, #2 and #5, and #3 and #6. Optimal injection timing is provided in accordance with the operating conditions of the engine.

Starting fuel injection volume and injection timing

The injectors are actuated in sync with the standard crankshaft position signals (BTDC 70°) for cylinder pairs #1 and #4, #2 and #5, and #3 and #6, respectively.

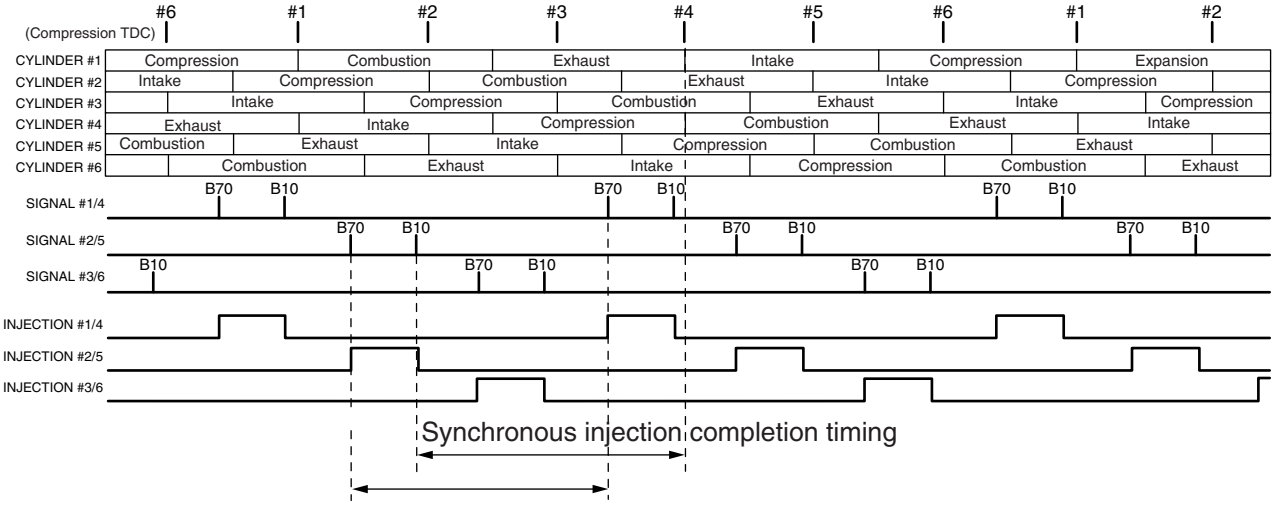


Starting injection start timing
(standard position BTDC 70˚)

S60L1200

Normal fuel injection volume and injection timing

To control the actuation timing of the injectors, the injection ending timing is established by using the top-dead-center of the intake stroke as the standard, for cylinder pairs #1 and #4, #2 and #5, and #3 and #6, respectively.



#1/4 synchronous injection start/completion
timing setting range

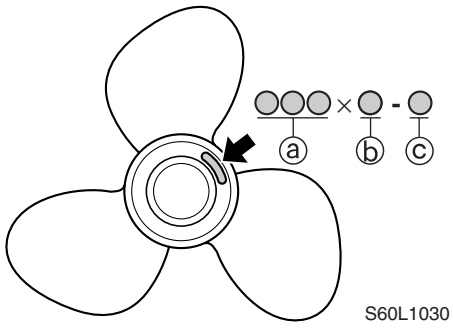
S60L1210

Propeller selection

The performance of a boat and outboard motor will be critically affected by the size and type of propeller you choose. Propellers greatly affect boat speed, acceleration, engine life, fuel economy, and even boating and steering capabilities. An incorrect choice could adversely affect performance and could also seriously damage the engine.
Use the following information as a guide for selecting a propeller that meets the operating conditions of the boat and the outboard motor.

Propeller size

The size of the propeller is indicated on the propeller blade or outside of the propeller boss.



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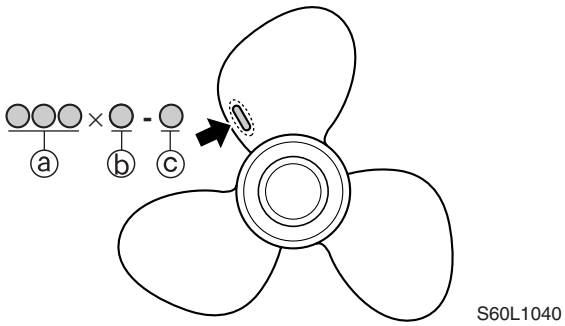

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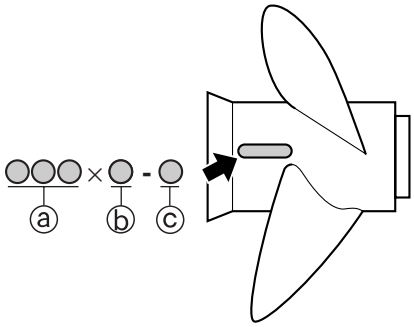


S60L1050

ⓐ Propeller diameter (in inches)
ⓑ Propeller pitch (in inches)
ⓒ Propeller type (propeller mark)

Selection

When the engine speed is at the full throttle operating range (5,000–6,000 r/min), the ideal propeller for the boat is one that provides maximum performance in relation to boat speed and fuel consumption.

Regular rotation model

Propeller size (in)	Material
13 3/4 × 17 - M	Stainless
13 3/4 × 19 - M	
13 3/4 × 21 - M	
14 1/2 × 15 - M	
14 1/2 × 19 - T	
14 1/2 × 21 - T	
14 7/8 × 21 - M	
14 7/8 × 23 - M	
15 × 17 - T	
15 1/4 × 15 - M	
15 1/4 × 17 - M	
15 1/4 × 19 - M	

Counter rotation model

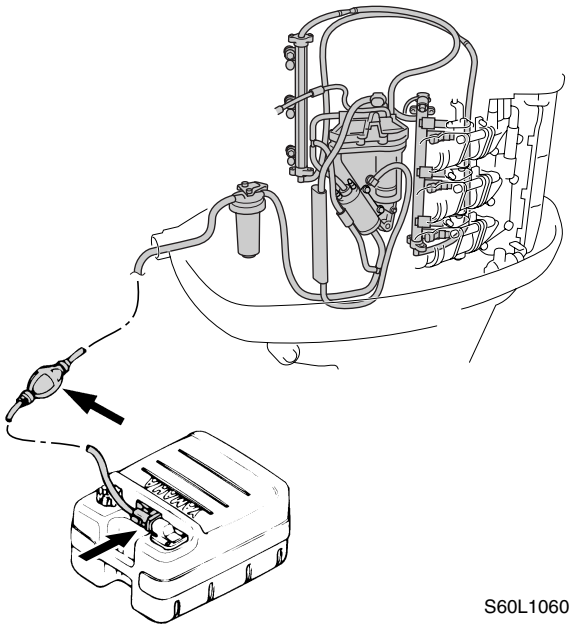
Propeller size (in)	Material
13 3/4 × 17 - ML	Stainless
13 3/4 × 19 - ML	
13 3/4 × 21 - ML	
14 1/2 × 15 - ML	
14 1/2 × 19 - TL	
14 1/2 × 21 - TL	
14 7/8 × 21 - ML	
14 7/8 × 23 - ML	
15 × 17 - TL	
15 1/4 × 15 - ML	
15 1/4 × 17 - ML	
15 1/4 × 19 - ML	

Predelivery checks

To make the delivery process smooth and efficient, the predelivery checks should be completed as explained below.

Checking the fuel system

1. Check that the fuel hoses are securely connected and that the fuel tank is full with fuel.



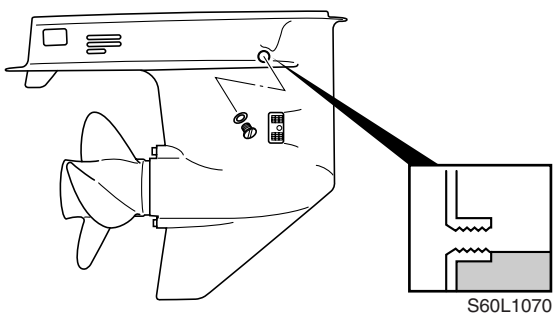
S60L1060

CAUTION:

This is a 4-stroke engine. Do not use pre-mixed fuel and 2-stroke outboard motor oil.

Checking the gear oil

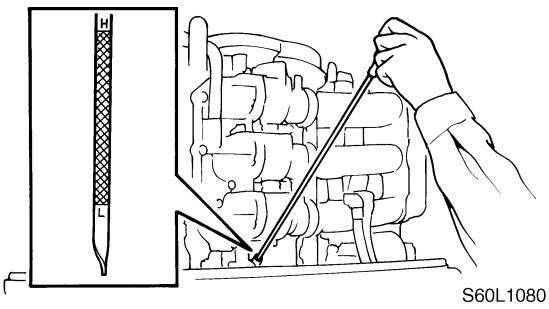
1. Check the gear oil level.



S60L1070

Checking the engine oil

1. Check the oil level.



S60L1080

NOTE:

- If the engine oil is above the maximum level mark (H), drain sufficient oil until the level is between (H) and (L).
- If the engine oil is below the minimum level mark (L), add sufficient oil until the level is between (H) and (L).

Recommended engine oil:
4-stroke motor oil
API: SE, SF, SG, or SH
SAE: 10W-30 or 10W-40
Oil capacity:
Without oil filter replacement:
5.8 L (6.1 US qt, 5.1 Imp qt)

Checking the battery

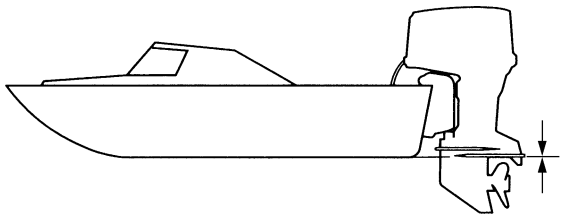
1. Check the capacity, electrolyte level, and specified gravity of the battery.

Battery capacity: 12 V–100 Ah

2. Check that the red and black battery cables are securely connected.

Checking the outboard motor mounting height

1. Check that the anti-cavitation plate is aligned with the bottom of the boat. If the mounting height is too high, cavitation will occur and propulsion will be reduced. Also, the engine speed will increase abnormally and cause the engine to overheat. If the mounting height is too low, water resistance will increase and reduce engine efficiency.



S60L1090

NOTE:

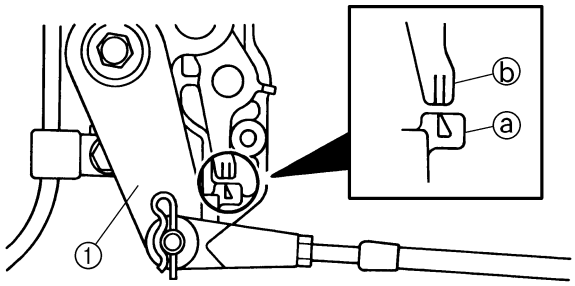
The optimum mounting height is affected by the combination of the boat and the outboard motor. To determine the optimum mounting height, test run the outboard motor at different heights.

2. Check that the clamp brackets are secured with the clamp bolts.

Checking the remote control cables

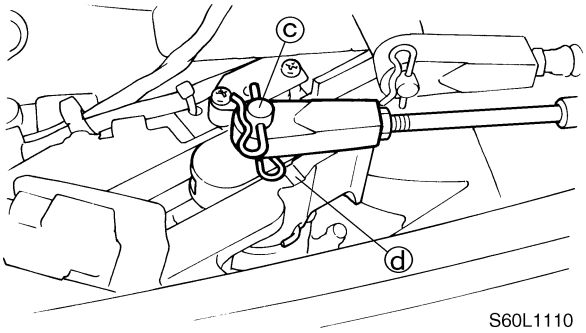
1. Set the remote control lever to the neutral position and fully close the throttle lever.

2. Check that the throttle cam ① is in its fully close position and the alignment mark ⓐ is between the alignment mark ⓑ.



S60L1100

3. Check that the set pin ⓒ is in the center of the shift bracket and aligned with the alignment mark ⓓ on the bracket.



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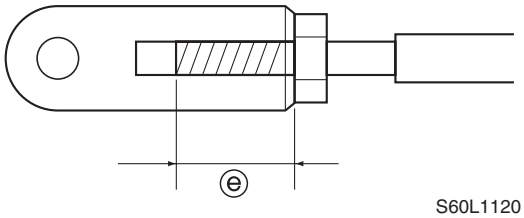


S60L1120

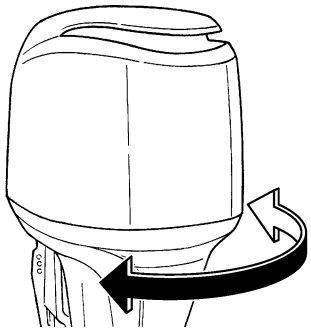
CAUTION:

The shift/throttle cable joint must be screwed in a minimum of 8.0 mm (0.31 in) ⓔ.

Checking the steering wheel

1. Check the steering friction for proper adjustment.

2. Check that the steering operates smoothly.

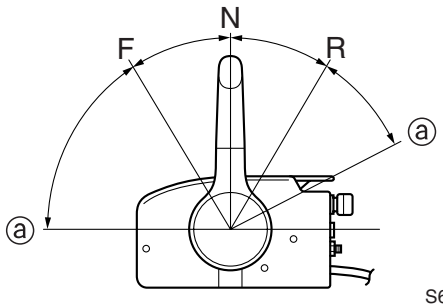

S60L1130

3. Check that there is no interference with wires or hoses when the outboard motor is steered.

Checking the gearshift and throttle operation

1. Check that the gearshift operates smoothly when the remote control lever is shifted from neutral into forward or reverse.

2. Check that the throttle operates smoothly when the remote control lever is shifted from the fully closed position to the fully open position ⓐ.



S60L1140

Checking the tilt system

1. Check that the outboard motor tilts up and down smoothly when operating the power trim and tilt unit.

2. Check that there is no abnormal noise produced when the outboard motor is tilted up or down.

3. Check that there is no interference with wires and hoses when the tilted-up outboard motor is steered.

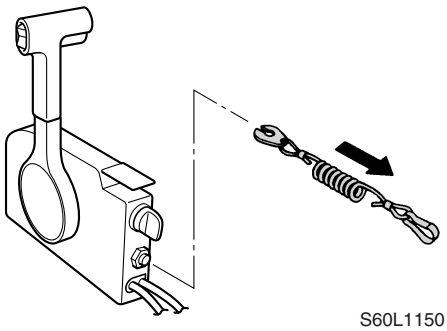
4. Check that the trim meter points down when the outboard motor is tilted all the way down.

Checking the engine start switch and engine stop switch/engine shut-off switch

1. Check that the engine starts when the engine start switch is turned to START.

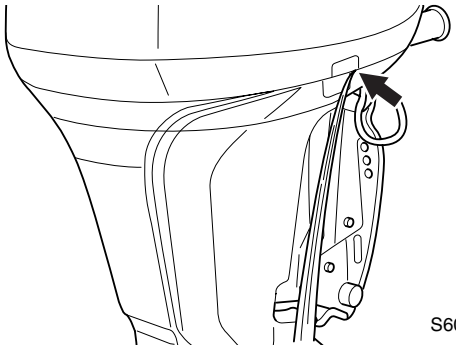
2. Check that the engine turns off when the engine start switch is turned to OFF.

3. Check that the engine turns off when the engine shut-off cord is pulled from the engine shut-off switch.


S60L1150

Checking the cooling water pilot hole

1. Start the engine, and then check that cooling water is discharged from the cooling water pilot hole.


S60L1160

Test run

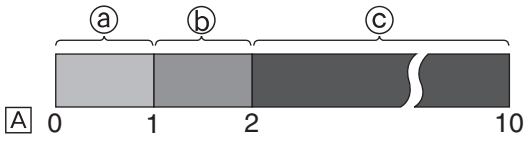
1. Start the engine, and then check that the gearshift operates smoothly.
2. Check the engine idle speed after the engine has been warmed up.
3. Operate at trolling speed.
4. Run the outboard motor for one hour at 2,000 r/min or at half throttle, then for another hour at 3,000 r/min or at 3/4 throttle.
5. Check that the outboard motor does not tilt up when shifting into reverse and that water does not flow in over the transom.

NOTE:
The test run is part of the break-in operation.

Break-in

During the test run, perform the break-in operation in the following three stages.

1. One hour ⓐ at 2,000 r/min or at approximately half throttle.
2. One hour ⓑ at 3,000 r/min or 3/4 throttle and one minute out of every ten at full throttle.
3. Eight hours ⓒ at any speed, however, avoid running at full speed for more than five minutes.



S60L1170

A Hour

After test run

1. Check for water in the gear oil.
2. Check for fuel leakage in the cowling.
3. After a test run and while the engine is at idle, flush the cooling water passage with fresh water using the flushing kit.

General specifications

Item	Unit	Model	
		F200AET	FL200AET
Dimension			
Overall length	mm (in)	892 (35.1)	
Overall width	mm (in)	634 (25.0)	
Overall height (X)	mm (in)	1,805 (71.1)	
Boat transom height (X)	mm (in)	635 (25.0)	
Weight(*1) (X)	kg (lb)	269 (593)	
Performance			
Maximum output	kW (hp) at 5,500 r/min	147.1 (200)	
Full throttle operating range	r/min	5,000–6,000	
Maximum fuel consumption	L (US gal, lmp gal)/hr at 6,000 r/min	66.0 (17.4, 14.5)	
Power unit			
Type		V6, 4-stroke, DOHC, 24 valves	
Cylinder quantity		6	
Displacement	cm^3 (cu. in)	3,352 (204.5)	
Bore × stroke	mm (in)	94.0 × 80.5 (3.70 × 3.17)	
Compression ratio		9.9	
Control system		Remote control	
Starting system		Electric	
Ignition control system		Microcomputer (TCI)	
Ignition timing	Degree	TDC–BTDC 21	
Alternator output	V, A	12, 45	
Spark plugs		LFR5A-11 (NGK)	
Cooling system		Water	
Exhaust system		Through propeller boss	
Lubrication system		Wet sump	

(*1) Includes a stainless propeller and excludes oil, battery cables and rigging parts.

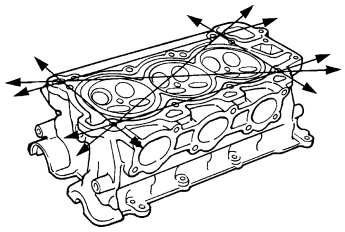
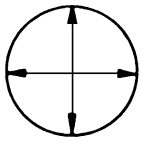
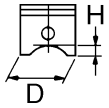
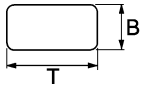
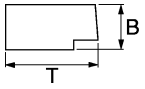
Specifications

Item	Unit	Model	
		F200AET	FL200AET
Fuel and oil			
Fuel type		Regular unleaded gasoline	
Fuel rating	PON*	86	
	RON	91	
Engine oil type		4-stroke motor oil	
Engine oil grade	API	SE, SF, SG, or SH	
	SAE	10W-30 or 10W-40	
Engine oil quantity			
(with oil filter replacement)	L (US qt, Imp qt)	6.0 (6.3, 5.3)	
(without oil filter replacement)	L (US qt, Imp qt)	5.8 (6.1, 5.1)	
Gear oil type		Hypoid gear oil	
Gear oil grade	API	GL-4	
	SAE	90	
Gear oil quantity	L (US qt, Imp qt)	1.15 (1.22, 1.01)	1.00 (1.06, 0.88)
Bracket			
Trim angle (at 12 degree boat transom)	Degree	–3–16	
Tilt-up angle	Degree	70	
Steering angle	Degree	32 + 32	
Drive unit			
Gearshift positions		F-N-R	
Gear ratio		2.00 (30/15)	
Reduction gear type		Spiral bevel gear	
Clutch type		Dog clutch	
Propeller shaft type		Spline	
Propeller direction (rear view)		Clockwise	Counterclockwise
Propeller identification mark		T, M	TL, ML
Electrical			
Battery capacity	V–Ah	12–100	

* PON: Pump Octane Number = (Research Octane Number + Motor Octane Number)/2
RON: Research Octane Number

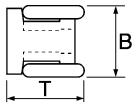
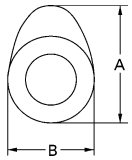
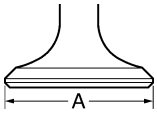
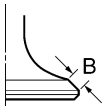
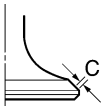
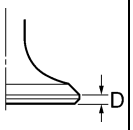
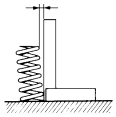
Maintenance specifications

Power unit

Item	Unit	Model	
		F200AET	FL200AET
Power unit			
Minimum compression pressure*	kPa (kgf/cm², psi)	880 (8.8, 125)	
Lubrication oil pressure	kPa (kgf/cm², psi) at 700 r/min	650 (6.5, 924)	
Cylinder heads			
Warpage limit  (lines indicate straightedge position)	mm (in)	0.1 (0.004)	
Camshaft cap inside diameter	mm (in)	25.00–25.02 (0.9843–0.9850)	
Cylinders 			
Bore size	mm (in)	94.00–94.02 (3.7008–3.7016)	
Taper limit	mm (in)	0.05 (0.0020)	
Out-of-round limit	mm (in)	0.01 (0.0004)	
Pistons 			
Piston diameter (D)	mm (in)	93.921–93.941 (3.6977–3.6985)	
Measuring point (H)	mm (in)	5 (0.2)	
Piston-to-cylinder clearance	mm (in)	0.075–0.080 (0.0029–0.0031)	
Piston pin boss bore	mm (in)	21.02–21.03 (0.8276–0.8280)	
Piston pins			
Outside diameter	mm (in)	21.00 (0.827)	
Piston rings			
Top ring			
Dimension B 	mm (in)	1.17–1.19 (0.0461–0.0468)	
Dimension T	mm (in)	2.8–3.0 (0.110–0.118)	
End gap	mm (in)	0.15–0.30 (0.0059–0.0118)	
Side clearance	mm (in)	0.04–0.08 (0.0016–0.0031)	
2nd ring			
Dimension B 	mm (in)	1.17–1.19 (0.0461–0.0468)	
Dimension T	mm (in)	3.6–3.8 (0.142–0.150)	
End gap	mm (in)	0.30–0.45 (0.0118–0.0177)	
Side clearance	mm (in)	0.03–0.07 (0.0012–0.0027)	

* Measuring conditions:
Ambient temperature 20 °C (68 °F), wide open throttle, with plugs disconnected from all cylinders.
The figures are for reference only.

Specifications

Item	Unit	Model	
		F200AET	FL200AET
Oil ring			
			
Dimension B	mm (in)	2.40–2.47 (0.0945–0.0972)	
Dimension T	mm (in)	2.3–2.7 (0.091–0.106)	
End gap	mm (in)	0.15–0.60 (0.0059–0.0236)	
Side clearance	mm (in)	0.04–0.13 (0.0016–0.0051)	
Camshafts			
			
Intake (A)	mm (in)	45.30–45.40 (1.7835–1.7874)	
Exhaust (A)	mm (in)	45.35–45.45 (1.7854–1.7894)	
Intake and exhaust (B)	mm (in)	35.95–36.05 (1.4154–1.4193)	
Camshaft journal diameter	mm (in)	24.96–24.98 (0.9827–0.9834)	
Camshaft journal oil clearance	mm (in)	0.02–0.06 (0.0008–0.0023)	
Camshaft runout limit	mm (in)	0.1 (0.004)	
Valves			
Valve clearance (cold)			
Intake	mm (in)	0.20 ± 0.03 (0.008 ± 0.001)	
Exhaust	mm (in)	0.34 ± 0.03 (0.013 ± 0.001)	
Head diameter (A)			
Intake	mm (in)	34.85–35.15 (1.3720–1.3839)	
Exhaust	mm (in)	29.85–30.15 (1.1752–1.1870)	
			
Face width (B)			
Intake	mm (in)	2.11 (0.0831)	
Exhaust	mm (in)	2.43 (0.0957)	
			
Seat contact width (C)			
Intake	mm (in)	1.1–1.4 (0.043–0.055)	
Exhaust	mm (in)	1.4–1.7 (0.055–0.067)	
			
Margin thickness (D)			
Intake	mm (in)	0.7 (0.028)	
Exhaust	mm (in)	1.0 (0.039)	
			
Stem diameter			
Intake	mm (in)	5.477–5.492 (0.2156–0.2162)	
Exhaust	mm (in)	5.464–5.479 (0.2151–0.2157)	
Guide inside diameter			
Intake and exhaust	mm (in)	5.51–5.52 (0.2169–0.2173)	
Stem-to-guide clearance			
Intake	mm (in)	0.01–0.02 (0.0004–0.0008)	
Exhaust	mm (in)	0.01–0.02 (0.0004–0.0008)	
Stem runout limit	mm (in)	0.01 (0.0004)	
Valve springs			
			
Free length	mm (in)	44.20 (1.740)	
Minimum free length	mm (in)	42.60 (1.677)	
Tilt limit	mm (in)	1.5 (0.06)	

Item	Unit	Model	
		F200AET	FL200AET
Valve lifters			
Valve lifter outside diameter	mm (in)	32.98–33.00 (1.2984–1.2992)	
Valve lifter-to-cylinder head clearance	mm (in)	0.02–0.05 (0.0008–0.0020)	
Valve shims			
Valve shim thickness (in 0.020 mm increments)	mm (in)	2.320–2.960 (0.0913–0.1165)	
Connecting rods			
Small-end inside diameter	mm (in)	21.00 (0.827)	
Big-end inside diameter	mm (in)	53.00 (2.087)	
Crankpin oil clearance	mm (in)	0.035–0.071 (0.0014–0.0028)	
Big-end bearing thickness			
Yellow	mm (in)	1.492–1.496 (0.0587–0.0588)	
Green	mm (in)	1.496–1.500 (0.0588–0.0591)	
Blue	mm (in)	1.500–1.504 (0.0591–0.0592)	
Crankshaft			
Crankshaft journal diameter	mm (in)	62.968–62.992 (2.4791–2.4800)	
Crankpin diameter	mm (in)	49.976–50.000 (1.9676–1.9685)	
Crankpin width	mm (in)	21.50–21.55 (0.8465–0.8484)	
Runout limit	mm (in)	0.03 (0.0012)	
Crankcase			
Crankshaft main journal oil clearance	mm (in)	0.025–0.050 (0.0010–0.0020)	
Upper crankcase main journal bearing thickness			
1	mm (in)	2.494–2.500 (0.0981–0.0984)	
2	mm (in)	2.498–2.504 (0.0983–0.0986)	
3	mm (in)	2.502–2.508 (0.0985–0.0987)	
Lower crankcase main journal bearing thickness			
1	mm (in)	2.494–2.500 (0.0981–0.0984)	
2	mm (in)	2.498–2.504 (0.0983–0.0986)	
3	mm (in)	2.502–2.508 (0.0985–0.0987)	
#3 main journal bearing thickness (lower)			
1	mm (in)	2.492–2.500 (0.0980–0.0984)	
2	mm (in)	2.496–2.504 (0.0982–0.0986)	
3	mm (in)	2.500–2.508 (0.0984–0.0987)	

Specifications

Item	Unit	Model	
		F200AET	FL200AET
Oil pump			
Discharge at 97–103 °C (207–217 °F) with 10W-40 engine oil	L (US gal, Imp gal)/min at 700 r/min	8.8 (2.32, 1.94)	
Pressure	kPa (kgf/cm², psi)	138 (1.38, 19.62)	
Relief valve opening pressure	kPa (kgf/cm², psi)	529–647 (5.29–6.47, 75.22–92.00)	
Thermostats			
Opening temperature	°C (°F)	60 (140)	
Fully open temperature	°C (°F)	70 (158)	
Valve open lower limit	mm (in)	4.3 (0.17)	
Engine speed			
Engine idle speed	r/min	650–750	

Lower unit

Item	Unit	Model	
		F200AET	FL200AET
Gear backlash			
Pinion-to-forward gear	mm (in)	0.21–0.44 (0.008–0.017)	0.35–0.70 (0.014–0.028)
Pinion-to-reverse gear	mm (in)	0.70–1.03 (0.028–0.041)	0.70–1.03 (0.028–0.041)
Pinion shims	mm	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50	
Forward gear shims	mm	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50	
Reverse gear shims	mm	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50	
Propeller shaft shims	mm	—	0.10, 0.12, 0.15, 0.18, 0.30, 0.40, 0.50

Electrical

Item	Unit	Model	
		F200AET	FL200AET
Ignition and ignition control system			
Ignition timing (engine idle speed)	Degree	TDC	
Pulser coil output peak voltage (W/R – B, W/B – B, W/G – B)			
at cranking (unloaded)	V	5.3	
at cranking (loaded)	V	5.3	
at 1,500 r/min (loaded)	V	20	
at 3,500 r/min (loaded)	V	43	
Pulser coil resistance(*1) (W/R – B, W/B – B, W/G – B)	Ω	459–561	
ECM output peak voltage (B/O – B, B/Y – B, B/W – B)			
at cranking (loaded)	V	252	
at 1,500 r/min (loaded)	V	260	
at 3,500 r/min (loaded)	V	260	
Spark plug gap	mm (in)	1.1 (0.043)	
Ignition coil resistance			
Primary coil (R/Y – B/O, R/Y – B/Y, R/Y – B/W)	Ω	1.5–1.9	
Secondary coil (spark plug wire – spark plug wire)	kΩ	19.6–35.4	
Throttle position sensor output voltage (P – B)	mV	695–705	
Oil pressure sensor output voltage (engine idle speed) (O – B)	V	3.8	
Intake air temperature sensor resistance			
at 0 °C (32 °F)	kΩ	5.4–6.6	
at 80 °C (176 °F)	kΩ	0.29–0.39	
Engine temperature sensor resistance (B/Y – B)			
at 20 °C (68 °F)	kΩ	54.2–69.0	
at 100 °C (212 °F)	kΩ	3.12–3.48	
Thermoswitch continuity temperature (P – B)			
ON	°C (°F)	84–90 (183–194)	
OFF	°C (°F)	68–82 (154–179)	

(*1) The figures are for reference only.

Specifications

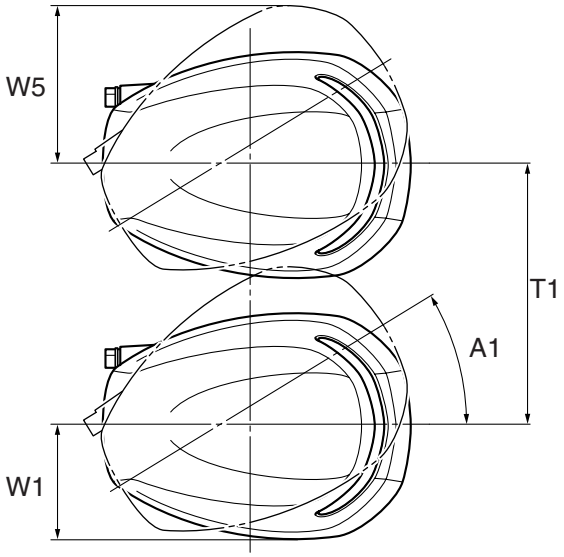
Item	Unit	Model	
		F200AET	FL200AET
Fuel control system			
Fuel injector output peak voltage(*1) (R/Y – O/R, R/Y – O/B, R/Y – O/Y, R/Y – O/R, R/Y – O/B, R/Y – O/Y)			
at 1,500–3,000 r/min (loaded)	V	38–40	
Fuel injector resistance(*1)			
at 20 °C (68 °F)	Ω	14.0–15.0	
Starter motor			
Type		Sliding gear	
Output	kW	1.4	
Cranking time limit	Second	30	
Brushes			
Standard length	mm (in)	15.5 (0.61)	
Wear limit	mm (in)	9.5 (0.37)	
Commutator			
Standard diameter	mm (in)	29.0 (1.14)	
Wear limit	mm (in)	28.0 (1.10)	
Mica			
Standard undercut	mm (in)	0.5–0.8 (0.02–0.03)	
Wear limit	mm (in)	0.2 (0.01)	
Charging system			
Fuse	A	5, 20, 30	
Stator coil output peak voltage (G – G)			
at cranking (unloaded)	V	10	
at 1,500 r/min (unloaded)	V	42	
at 3,500 r/min (unloaded)	V	93	
(G/W – G/W)			
at cranking (unloaded)	V	9.0	
at 1,500 r/min (unloaded)	V	34	
at 3,500 r/min (unloaded)	V	78	
Stator coil resistance(*1)			
(G – G)	Ω	0.24–0.41	
(G/W – G/W)	Ω	0.21–0.30	
Rectifier Regulator output peak voltage (R – B, R/Y – B)			
at 1,500 r/min (unloaded)	V	13	
at 3,500 r/min (unloaded)	V	13	

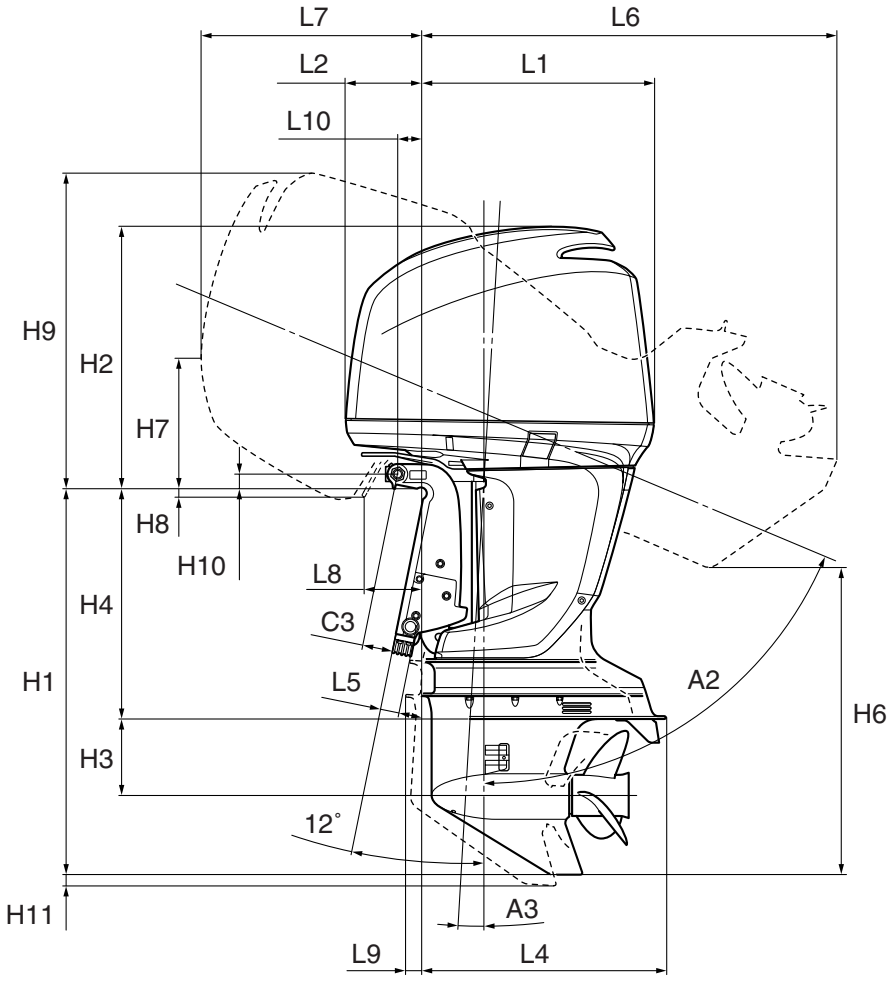
(*1) The figures are for reference only.

Item	Unit	Model	
		F200AET	FL200AET
Power trim and tilt system			
Trim sensor			
Setting resistance	Ω	9–11	
Resistance (P – B)	Ω	9–387.6	
Fluid type		ATF Dexron II	
Brushes			
Standard length	mm (in)	12.0 (0.47)	
Wear limit	mm (in)	4.0 (0.16)	
Commutator			
Standard diameter	mm (in)	25.0 (0.98)	

Dimensions

Exterior





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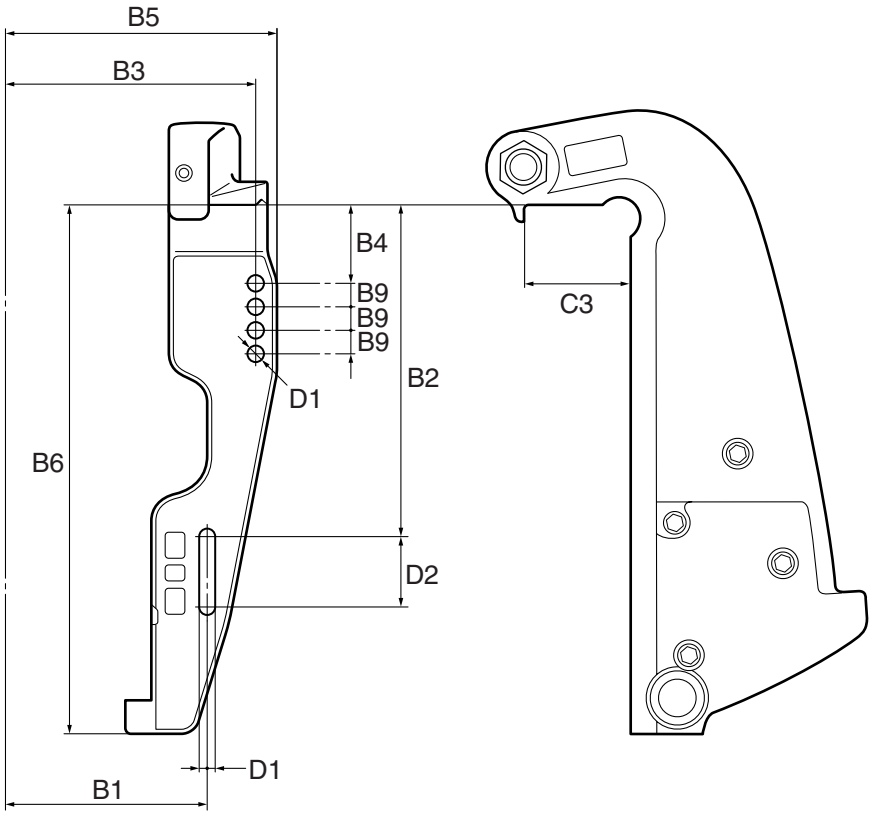
Symbol		Unit	Model	
			F200AET	FL200AET
L1		mm (in)	651 (25.6)	
L2		mm (in)	219 (8.6)	
L3		mm (in)	—	
L4		mm (in)	673 (26.5)	
L5	(X)	mm (in)	59 (2.3)	
L6	(X)	mm (in)	1,155 (45.5)	
L7		mm (in)	618 (24.3)	
L8		mm (in)	230 (9.1)	
L9	(X)	mm (in)	52 (2.0)	
L10		mm (in)	75 (3.0)	
H1	(X)	mm (in)	1,078 (42.4)	
H2		mm (in)	727 (28.6)	
H3		mm (in)	216 (8.5)	
H4	(X)	mm (in)	643 (25.3)	
H5		mm (in)	—	
H6	(X)	mm (in)	847 (33.3)	
H7		mm (in)	361 (14.2)	
H8		mm (in)	39 (1.5)	
H9		mm (in)	880 (34.6)	
H10		mm (in)	45 (1.8)	
H11	(X)	mm (in)	25 (1.0)	
W1		mm (in)	317 (12.5)	
W2		mm (in)	—	
W3		mm (in)	—	
W4		mm (in)	—	
W5		mm (in)	453 (17.8)	
W6		mm (in)	—	
A1		Degree	32	
A2		Degree	70	
A3		Degree	3	
T1		mm (in)	724 (28.5)	

Clamp bracket



Symbol	Unit	Model	
		F200AET	FL200AET
B1	mm (in)	125 (4.9)	
B2	mm (in)	254 (10.0)	
B3	mm (in)	163 (6.4)	
B4	mm (in)	51 (2.0)	
B5	mm (in)	180 (7.1)	
B6	mm (in)	411 (16.2)	
B7	mm (in)	—	
B8	mm (in)	—	
B9	mm (in)	19 (0.7)	
C2	mm (in)	—	
C3	mm (in)	79 (3.1)	
D1	mm (in)	13 (0.5)	
D2	mm (in)	56 (2.2)	

Tightening torques

Specified torques

Part to be tightened		Thread size	Tightening torques		
			N·m	kgf·m	ft·lb
Fuel system					
Fuel filter holder bolt		M6	8	0.8	5.8
Fuel filter bracket bolt		M6	8	0.8	5.8
Intake air temperature sensor		—	4	0.4	2.9
Low-pressure fuel pump bracket bolt		M5	5	0.5	3.6
Fuel cooler nut		—	5	0.5	3.6
Float chamber bracket bolt		M8	7	0.7	5.1
High-pressure fuel pump relay nut		—	3	0.3	2.1
Vapor separator cover screw		M4	2	0.2	1.4
Link rod nut		—	4	0.4	2.9
Magnet control lever joint		—	4	0.4	2.9
Throttle cam bolt		—	8	0.8	5.8
Power unit					
PTT motor lead bolt		M6	4	0.4	2.9
Upper case cover bolt		M6	8	0.8	5.8
Apron bolt		M6	8	0.8	5.8
Power unit bolt		M9 • M10	42	4.2	30
Flywheel magnet nut		—	240	24	174
PTT relay nut		—	4	0.4	2.9
Starter relay lead bolt		M6	4	0.4	2.9
Battery cable nut		—	9	0.9	6.5
Starter motor bolt		M8	29	2.9	21
Rectifier Regulator	1st	M6	6	0.6	4.3
	2nd		12	1.2	8.7
Link rod nut		—	4	0.4	2.9
Oil pressure sensor		—	18	1.8	13
Oil filter union bolt		—	34	3.4	25
Oil filter		—	18	1.8	13
Driven sprocket bolt		M10	60	6.0	43
Timing belt tensioner bolt		—	39	3.9	28
Drive sprocket bolt		M5	7	0.7	5.1
Cylinder head cover plate screw		M4	2	0.2	1.4
Cylinder head cover bolt	1st	M6	8	0.8	5.8
	2nd		8	0.8	5.8
Camshaft cap bolt	1st	M7	8	0.8	5.8
	2nd		17	1.7	12
Exhaust cover bolt	1st	M6	6	0.6	4.3
	2nd		12	1.2	8.7
Exhaust outer cover bolt	1st	M8	14	1.4	10
	2nd		28	2.8	20
Exhaust outer cover plug		M18	55	5.5	40

Specifications

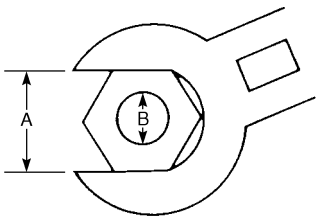
Part to be tightened		Thread size	Tightening torques		
			N·m	kgf·m	ft·lb
Timing chain tensioner bolt		M6	12	1.2	8.7
Spark plug		—	25	2.5	18
Cylinder head bolt	1st	M10	19	1.9	14
	2nd		37	3.7	27
	3rd		90°		
	1st	M8	14	1.4	10
	2nd		28	2.8	20
Engine hanger bolt		M6	12	1.2	8.7
Cooling water cover bolt		M6	12	1.2	8.7
Starboard cylinder head plug		—	23	2.3	17
Cylinder block plug		—	23	2.3	17
Engine temperature sensor		—	15	1.5	11
Connecting rod cap	1st	—	23	2.3	17
	2nd		48	4.8	35
	3rd		90°		
Baffle plate nut		—	12	1.2	8.7
Crankcase cover bolt	1st	M8	14	1.4	10
	2nd		28	2.8	20
Crankcase cover plate screw		M4	2	0.2	1.4
Oil pump screw		—	4	0.4	2.9
Crankcase stud bolt	1st	M8	25	2.5	18
	2nd		90°		
Crankcase bolt	1st	M10	40	4.0	29
	2nd		90°		
	1st	M8	14	1.4	10
	2nd		28	2.8	20
Lower unit (regular rotation model)					
Trim tab bolt		M10	43	4.3	31
Lower unit bolt		M10	47	4.7	34
Propeller nut		—	55	5.5	40
Propeller shaft housing grease nipple		—	6	0.6	4.3
Propeller shaft housing bolt		M8	30	3.0	22
Pinion nut		—	142	14.2	103
Lower unit (counter rotation model)					
Trim tab bolt		M10	43	4.3	31
Lower unit bolt		M10	47	4.7	34
Propeller nut		—	55	5.5	40
Ring nut		—	108	10.8	78
Propeller shaft housing bolt		M8	30	3.0	22
Propeller shaft housing grease nipple		—	6	0.6	4.3
Pinion nut		—	142	14.2	103
Bracket unit					
Shift rod detent bolt		—	18	1.8	13
Flushing hose adapter screw		M6	5	0.5	3.6

Part to be tightened	Thread size	Tightening torques		
		N·m	kgf·m	ft·lb
Upper case mount nut	—	72	7.2	52
Engine oil drain bolt	M14	27	2.7	19
Apron stay	—	8	0.8	5.8
Pressure control valve	—	8	0.8	5.8
Upper exhaust guide bolt	M8	20	2.0	14
	M10	42	4.2	30
Oil strainer bolt	M6	10	1.0	7.2
Oil pan bolt	M8	20	2.0	14
Exhaust manifold bolt	M8	20	2.0	14
Muffler bolt	M8	20	2.0	14
Baffle plate screw	M6	4	0.4	2.9
Clamp bracket self-locking nut	—	22	2.2	16
Friction plate screw	M6	4	0.4	2.9
Trim stopper nut	—	36	3.6	25
Power trim and tilt unit				
Power trim and tilt unit bolt	M10	44	4.4	32
Reservoir bolt	M8	18	1.8	13
Reservoir cap	M12	7	0.7	5.1
Manual valve	—	2	0.2	1.4
Fluid pipe	—	15	1.5	11
Trim cylinder end screw	—	160	16	115
Trim piston bolt	M8	38	3.8	27
Tilt ram	—	55	5.5	40
Tilt cylinder end screw	—	90	9.0	65
Tilt piston bolt	M6	7	0.7	5.1
Gear housing bolt	M5	7	0.7	5.1
Gear housing bracket bolt	M5	7	0.7	5.1

General torques

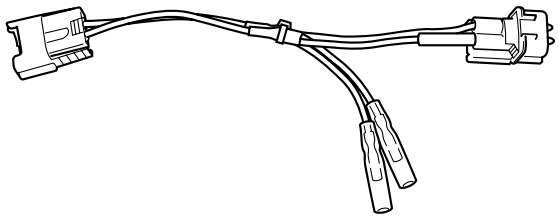
This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided in applicable sections of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross fashion and progressive stages until the specified torque is reached. Unless otherwise specified, torque specifications require clean, dry threads. Components should be at room temperature.

Nut (A)	Bolt (B)	General torque specifications		
		N·m	kgf·m	ft·lb
8 mm	M5	5	0.5	3.6
10 mm	M6	8	0.8	5.8
12 mm	M8	18	1.8	13
14 mm	M10	36	3.6	25
17 mm	M12	43	4.3	31

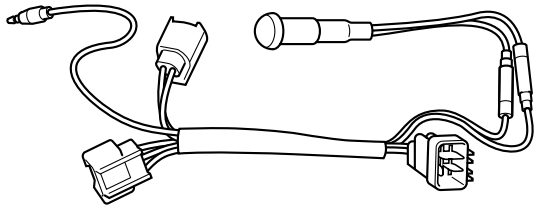


S60L2150

Special service tools



Test harness (2 pins)
90890-06861



Diagnostic flash indicator 4
90890-06795

Maintenance interval chart

Use the following chart as a guideline for general maintenance.
Adjust the maintenance intervals according to the operating conditions of the outboard motor.

Item	Remarks	Initial		Every		
		10 hours (Break-in)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)	400 hours (2 years)
Top cowling						
Top cowling fit	Check	○ (before each use)				
Fuel system						
Fuel joint and fuel hoses	Check	○ (before each use)				
Fuel filter (disposable type)	Check/replace	○		○		
Fuel filter (water separator)	Check	○ (before each use)				
Fuel tank(*1)	Clean				○	
Power unit						
Engine oil	Check	○ (before each use)				
	Change	○		○		
Oil filter	Change				○	
Oil pump	Check					○
Timing chain	Check/replace			○ (1,000 hours or 5 years)		
Chain tensioner	Check/replace					○
Timing belt(*2)	Check/replace				○	
Valve clearance	Check/adjust					○
Spark plugs	Clean/adjust/replace	○			○	
Thermostat	Check				○	
Pressure control valve	Check				○	
Flywheel magnet nut	Check	○				
Motor exterior	Check	○ (before each use)				
Oil leakage	Check	○	○	○		
Cooling water passage(*3)	Clean	○ (after each use)				
Control system						
Throttle link	Check/adjust				○	
Throttle cable	Check/adjust				○	
Shift cable	Check/adjust				○	
Engine idle speed	Adjust	○			○	
Ignition timing	Check	○				
Power trim and tilt unit						
Power trim and tilt unit	Check				○	

3

Periodic checks and adjustments

Item	Remarks	Initial		Every		
		10 hours (Break-in)	50 hours (3 months)	100 hours (6 months)	200 hours (1 year)	400 hours (2 years)
Lower unit						
Gear oil	Change	○		○		
Impeller/Woodruff key	Check/replace			○ (500 hours or 30 months)		
Oil seals	Check/replace			○		
Propeller	Check	○ (before each use)				
General						
Anodes/Trim tab	Check/replace				○	
Battery	Check/charge				○	
Wiring and connectors	Adjust/reconnect	○			○	
Nuts and bolts(*4)	Tighten	○			○	
Lubrication points	Lubricate			○		

NOTE:

(*1) If equipped with a portable fuel tank.

(*2) Be sure to replace the timing belt every 1,000 hours of operation or every five years.

(*3) The engine should be flushed with fresh water after operating in salt, turbid, or muddy water.

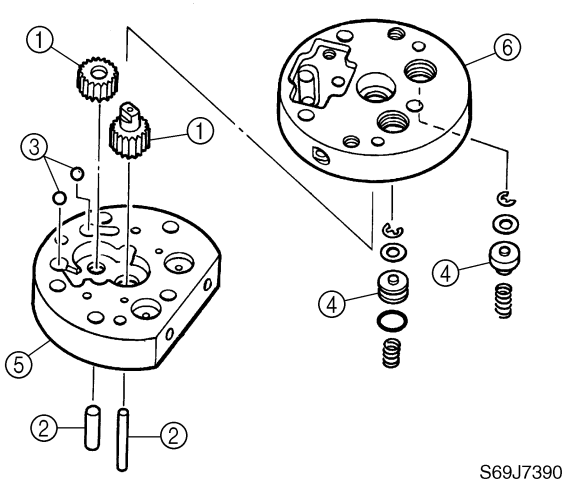
(*4) Do not retighten the cylinder head and crankcase bolts.

Power trim and tilt unit

Assembling the gear pump

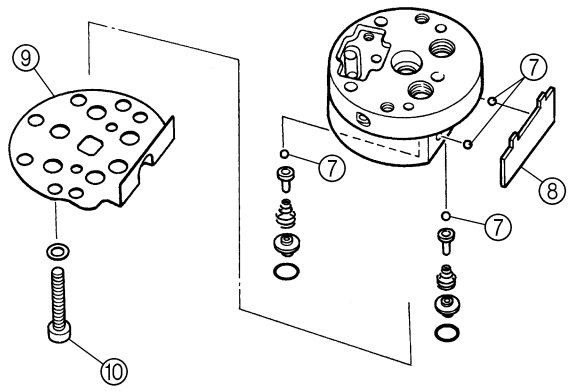
1. Install the drive gears ①, dowel pins ②, balls ③, and shuttle pistons ④ into the gear housing 1 ⑤.

2. Install the gear housing 2 ⑥.



S69J7390

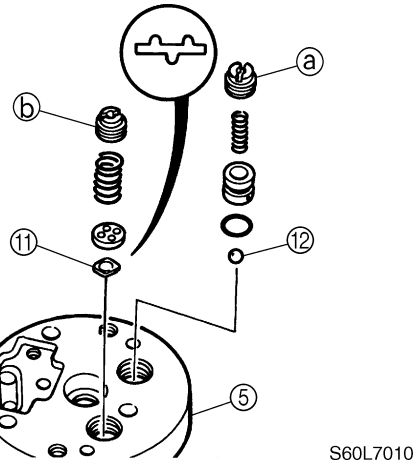
3. Install the balls ⑦, manual release spring ⑧, and bracket ⑨ by installing the bolts ⑩, then tightening them to the specified torque.



S69J7395

Gear pump bracket bolt ⑩:
7 N·m (0.7 kgf·m, 5.1 ft·lb)

4. Install the relief valve seal ⑪ and ball ⑫ into the gear housing 1 ⑤.

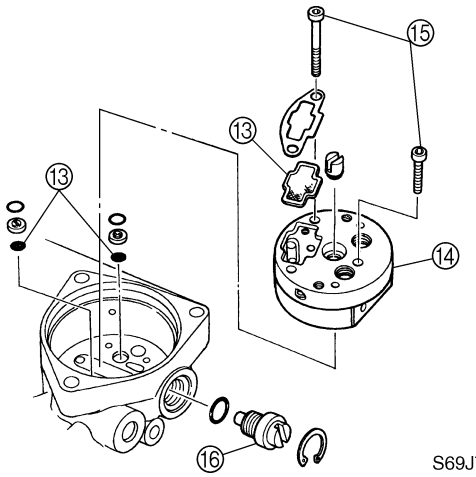


S60L7010

Up-relief lock screw ⓐ height
(from the top of the gear housing):
1.8–2.0 mm (0.071–0.079 in)
Down-relief lock screw ⓑ depth
(from the top of the gear housing):
1.5–2.0 mm (0.059–0.079 in)

5. Install the filters ⑬ and gear pump ⑭ by installing the bolts ⑮, then tightening them to the specified torque.

6. Install the manual valve ⑯.



S69J7405

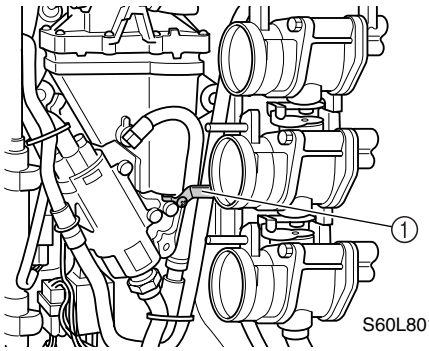
Gear pump bolt ⑮:
7 N·m (0.7 kgf·m, 5.1 ft·lb)

Fuel control system

Checking the fuel injector

1. Remove the intake silencer and disconnect the fuel injector coupler.

2. Connect the test harness (2 pins) to the fuel injector.

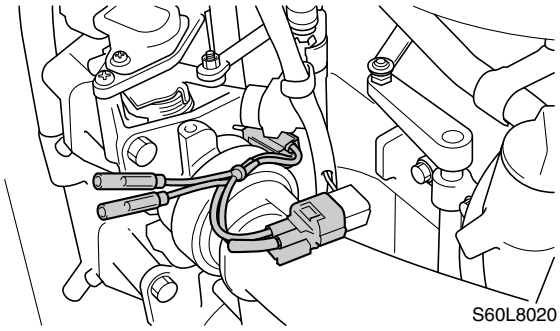


NOTE:
Before connecting the test harness to the fuel injector of cylinder #4, remove the vapor separator bracket ①.

3. Install the intake silencer.

CAUTION:
Do not start the engine when the intake silencer is not installed.

4. Measure the fuel injector output peak voltage. If out of specification, measure the fuel injector resistance.

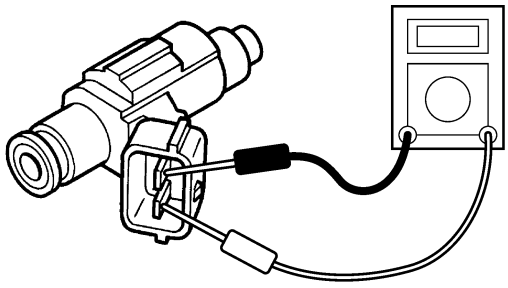


Digital circuit tester: 90890-03174
Peak voltage adaptor: 90890-03172
Test harness (2 pins): 90890-06861

Fuel injector output peak voltage (use as reference):
#1 Red/yellow (R/Y) – Orange/red (O/R)
#2 Red/yellow (R/Y) – Orange/black (O/B)
#3 Red/yellow (R/Y) – Orange/yellow (O/Y)
#4 Red/yellow (R/Y) – Orange/red (O/R)
#5 Red/yellow (R/Y) – Orange/black (O/B)
#6 Red/yellow (R/Y) – Orange/yellow (O/Y)

r/min	Loaded
	1,500–3,000
DC V	38–40

5. Measure the resistance of the fuel injectors. Replace if out of specification.

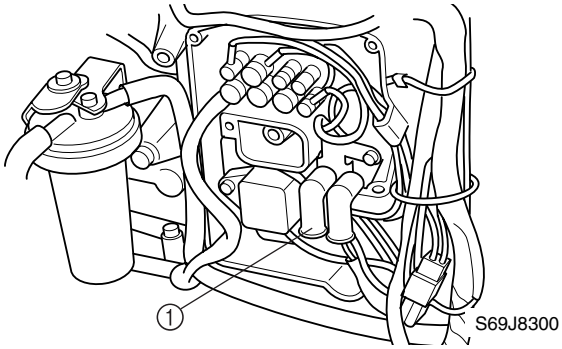


Digital circuit tester: 90890-03174

Fuel injector resistance (use as reference):
14.0–15.0 Ω at 20 °C (68 °F)

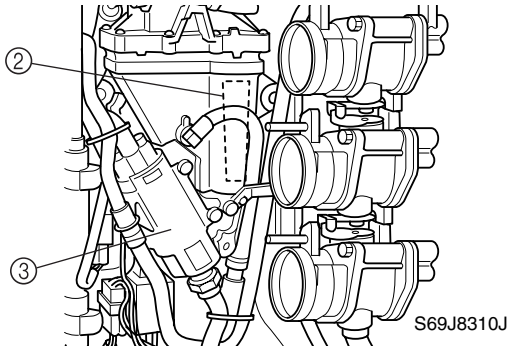
Checking the low-pressure fuel pump and high-pressure fuel pump

1. Disconnect the starter relay lead (brown lead) ① to prevent the engine from starting.



2. Turn the engine start switch to ON.

3. Listen for the operating sound of the high-pressure fuel pump ②. Replace if there is no sound.



NOTE:

- After the engine start switch is turned to ON, the high-pressure fuel pump will operate for 5 seconds.
- Check the operation of the low-pressure fuel pump ③ using the “Stationary test” of the Yamaha Diagnostic System.

* Change step 3 and the note in the F225 service manual to that mentioned above.

8

Yamaha Diagnostic System

Introduction

Hardware requirements

Make sure that your computer meets the following requirements before using this software.

Computer:	IBM-compatible laptop computer
Operating system:	Microsoft Windows 95, Windows 98, Windows Me or Windows 2000 (English version)
CPU:	i486DX, 100 MHz or higher (Pentium 100 MHz or higher recommended)
Memory:	16 MB or more (32 MB or more recommended)
Hard disk free space:	20 MB or more (40 MB or more recommended)
Drive:	CD-ROM drive
Display:	VGA (640 × 480 pixels), VGA/SVGA (800 × 600 pixels), XGA (1024 × 768 pixels) 256 or more colors
Mouse:	Compatible with the operating system mentioned above
Communication port:	RS232C (Dsub-9 pin) port
Printer:	Compatible with the operating system mentioned above

NOTE:

- The amount of memory and the amount of free space on the hard disk differs depending on the computer.
- Using this software while there is not enough free space on the hard disk may cause errors and result in insufficient memory.
- This software may not run properly on some laptop computers.

Getting started

This section provides information on installing the Yamaha Diagnostic System under Windows 95, Windows 98, Windows Me, or Windows 2000.

Installing the Yamaha diagnostic system under Windows 95, Windows 98, Windows Me, or Windows 2000

NOTE:

- Before installing the Yamaha Diagnostic System, check that your computer meets the specified requirements. For detailed information on the system requirements.
- It is strongly recommended that you exit all other programs before running the installer.

1. Turn on your computer and start up Windows 95, Windows 98, Windows Me, or Windows 2000.

2. Insert the compact disc into the computer's CD-ROM drive.

3. Double-click the **My Computer** icon, then the **CD-ROM drive** icon, and then double-click the **Setup.exe** icon to start up the installer. (Fig. 1)

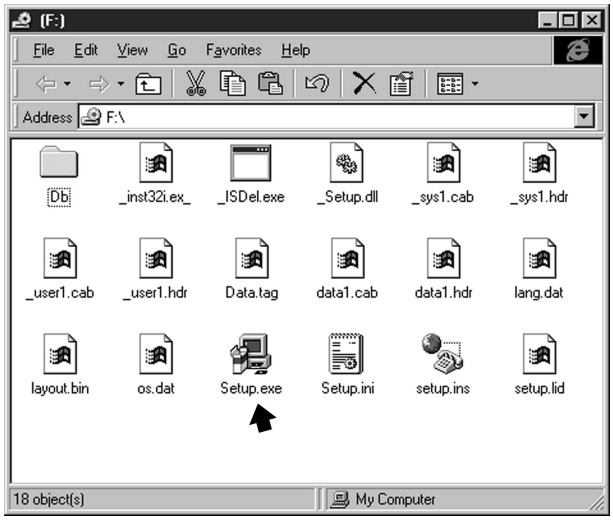


Fig. 1

4. Click the **Next** button to start the installation process. (Fig. 2)

Fig. 2

NOTE:

If the Yamaha Diagnostic System has already been installed onto your computer, the following dialog box appears.

Click the **Yes** button to update this program, or click the **No** button to quit the installation. (Fig. 3)

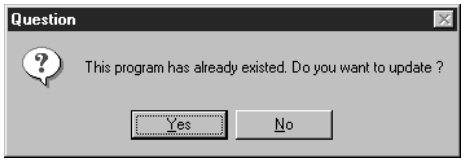


Fig. 3

NOTE:

• To quit the installation, click the **Cancel** button. The following dialog box appears.

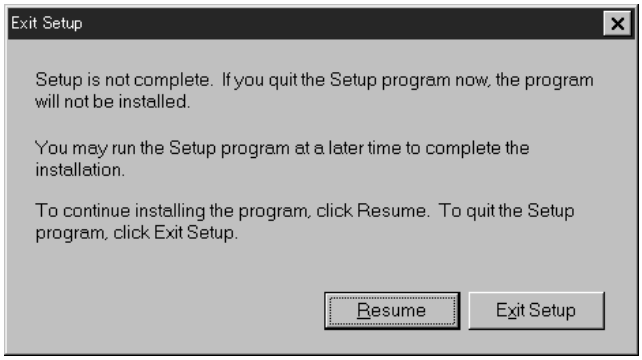


Fig. 4

• To quit the installation program, click the **Exit Setup** button.
• To resume the installation, click the **Resume** button. (Fig. 4)

5. Check the target directory and the program name for the Yamaha Diagnostic System, which are displayed in the dialog box.
   Click the **Next** button to start copying the program files.

NOTE:
- To go back to the previous dialog box (step 4), click the **Back** button.
- To quit the installation, click the **Cancel** button.

Fig. 5

NOTE:
If the Yamaha Diagnostic System has already been installed onto your computer, the following message (Fig. 6) appears.

Fig. 6

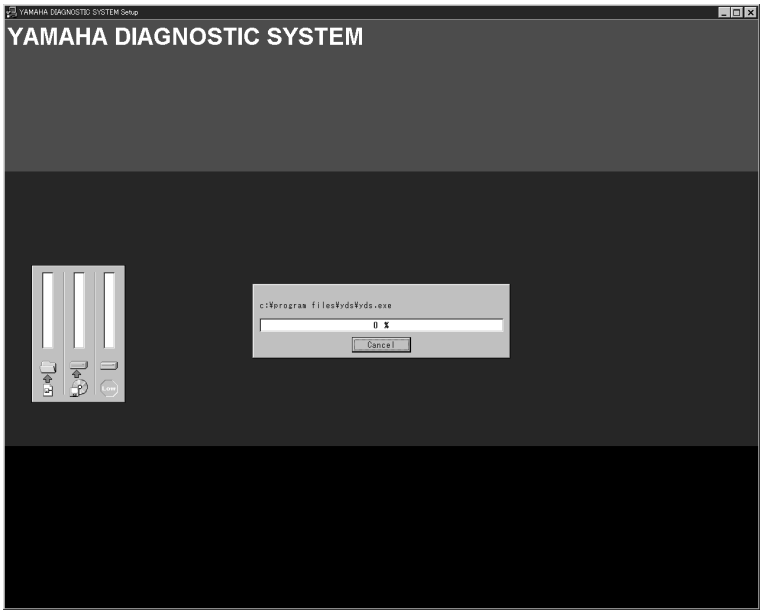


Fig. 7

6. After the installation is completed, the following dialog box appears. Click the **Finish** button to quit the installation program.

Fig. 8

NOTE:

Install the Database file before installing the Yamaha Diagnostic System, otherwise the program will not operate correctly. For installation procedures refer to “UPDATING THE DATABASE” on the next page.

Updating the database

NOTE:
When installing the Yamaha Diagnostic System program for the first time, be sure to update the database.

1. Turn on your computer and start up Windows 95, Windows 98, Windows Me, or Windows 2000.

2. From the taskbar at the bottom of your computer screen, click the **Start** button (fig. 9), point to **Programs**, and then click **Yamaha Diagnostic System** to open the Yamaha Diagnostic System window. (Fig. 10)

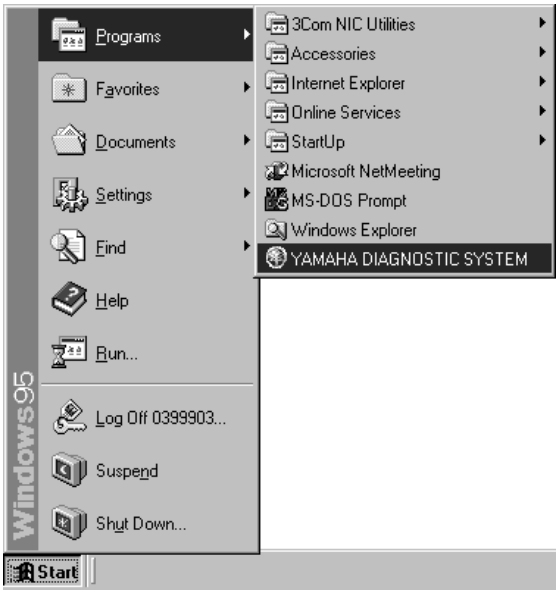


Fig. 9

3. After about three seconds the display will automatically go to the first menu display, or you can click or press any key to go to the first menu. (See fig. 11.)

Fig. 10

4. Click the **Update database [F1]** button or press the F1 key on your keyboard. (Fig. 11)

Fig. 11

NOTE:

Do not click the **Starting service tool [Enter]** button or press the Enter key on your keyboard until the database has been updated, otherwise the program will not operate correctly.

5. Insert the compact disc into the computer's CD-ROM drive.

NOTE:
- All the database files will be copied from the compact disc to the computer's hard drive automatically.
- Any earlier version of the database saved on the hard drive will be overwritten.

6. Click the **OK** button to start copying the database files. (Fig. 12)

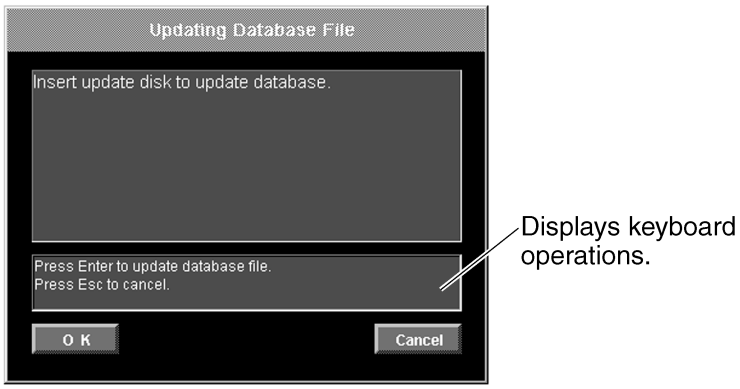


Fig. 12

NOTE:
If an error message appears and the program stops operating, follow the error message. (Fig. 13)

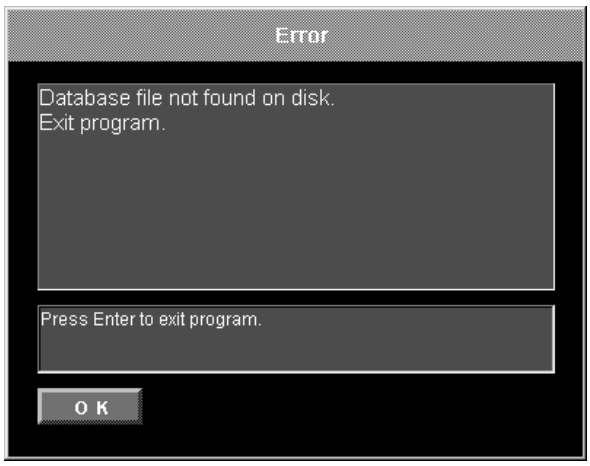


Fig. 13

7. When the database is updated a confirmation screen is displayed.
   To quit, click the **OK** button or press the Enter key on your keyboard. (Fig. 14)
   To return to the first menu screen, click the **Cancel** button or press the Esc key on your keyboard.

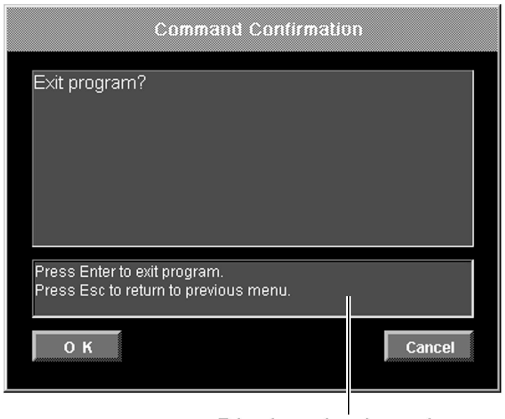


Fig. 14

NOTE:

- Display the program and database information to check version. (Fig. 15)
  To display information, click the title in the first menu screen while pressing the Shift key or press the Enter key while pressing Shift key. (See fig. 11.)

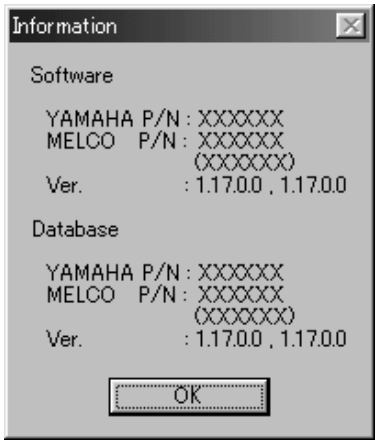


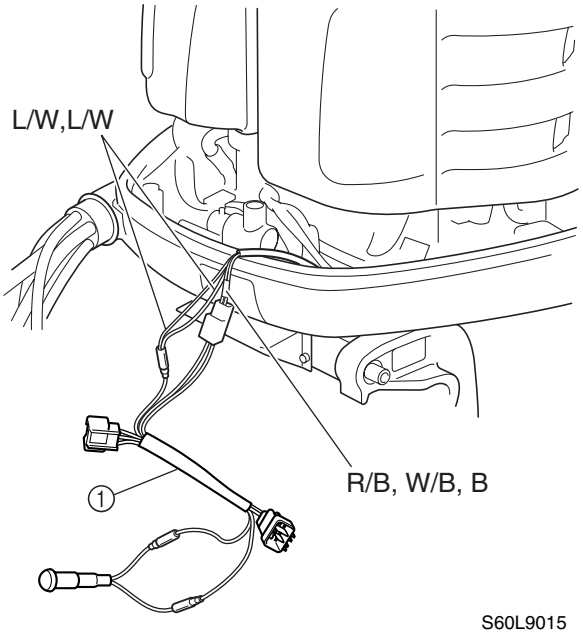
Fig. 15

8. To quit the Yamaha Diagnostic System from the first menu (see fig. 11), press the Esc key on your keyboard.

Self-diagnosis

Diagnosing the electronic control system

1. Connect the special tools to the outboard motor as shown.



S60L9015

NOTE:

When performing this diagnosis, all of the electrical wires must be properly connected.

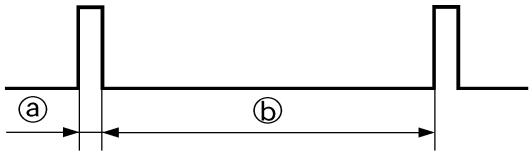
	Diagnostic flash indicator 4 ①: 90890-06795

2. Start the engine and let it idle.

3. Check the flash pattern of the diagnostic indicator to determine if there are any malfunctions.

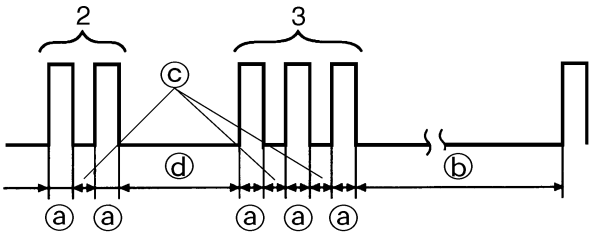
   - Normal condition
     (no defective part or irregular processing is found)

   - Single flash is given every 4.95 seconds.
     ⓐ: Light on, 0.33 second
     ⓑ: Light off, 4.95 seconds



S60L9020

   - Trouble code indication
     Example: The flash pattern in the illustration indicates code number 23.
     ⓐ: Light on, 0.33 second
     ⓑ: Light off, 4.95 seconds
     ⓒ: Light off, 0.33 second
     ⓓ: Light off, 1.65 seconds



S60L9030

4. If a flash pattern listed in the diagnosis code chart is displayed, check the malfunctioning part according to the flash pattern.

NOTE:

When more than one problem is detected, the light of the diagnostic tester flashes in the pattern of the lowest numbered problem. After that problem is corrected, the light flashes in the pattern of the next lowest numbered problem. This continues until all of the problems are detected and corrected.

Code	Symptom
01	Normal
13	Incorrect pulser coil signal
15	Incorrect engine temperature sensor signal
18	Incorrect throttle position sensor signal
19	Incorrect battery voltage
23	Incorrect intake air temperature sensor signal
28	Incorrect neutral switch signal
29	Incorrect intake air pressure sensor signal
37	Incorrect idle speed control signal
39	Incorrect oil pressure sensor signal
45	Incorrect shift cut switch signal
46	Incorrect thermoswitch signal
44	Incorrect engine stop switch signal

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Appendix

Incorrect information was included in the “Maintenance specification” and “Special service tools” in the current Service Manual.
Please make an appropriate correction using the information that is provided herein.

Applicable Service Manual: 69J-28197-3D-11 (290435)

WRONG		CORRECT
<P. 2-7> Spark plug gap 11 mm (0.43 in)	→	Spark plug gap 1.1 mm (0.043 in)
<P. 9-1> Yamaha Diagnostic System (upgrade) 68F-2819K-10	→	Yamaha Diagnostic System (upgrade) 68F-WS853-01
<P. 9-1, 9-61> Diagnostic flash indicator 4 90890-06795	→	Diagnostic flash indicator 90890-06765

Wiring diagram
F200AET, FL200AET

① Low-pressure fuel pump
② Low-pressure fuel pump driver
③ High-pressure fuel pump relay
④ High-pressure fuel pump
⑤ Idle speed control
⑥ Fuel injector
⑦ Spark plug
⑧ Ignition coil
⑨ Intake air pressure sensor
⑩ Thermoswitch
⑪ Engine temperature sensor
⑫ Pulser coil
⑬ Stator coil
⑭ Rectifier Regulator
⑮ Throttle position sensor
⑯ Shift cut switch
⑰ Neutral switch
⑱ ECM
⑲ Fuse (5 A)
⑳ Fuse (30 A)
㉑ Fuse (20 A)
㉒ Starter relay
㉓ Starter motor
㉔ Power trim and tilt relay
㉕ Power trim and tilt motor
㉖ Trim sensor
㉗ Battery
㉘ Intake air temperature sensor
㉙ Main relay
㉚ Oil pressure sensor
㉛ Power trim and tilt switch

Ⓐ To warning indicator
Ⓑ To remote control
Ⓒ To trim meter
Ⓓ To computer
Ⓔ To diagnostic indicator

Color code

B : Black
Br : Brown
G : Green
Gy : Gray
L : Blue
Lg : Light green
O : Orange
P : Pink
R : Red
Sb : Sky blue
W : White
Y : Yellow
B/O : Black/orange
B/W : Black/white
B/Y : Black/yellow
Br/W : Brown/white
G/B : Green/black
G/R : Green/red
G/W : Green/white
G/Y : Green/yellow
L/R : Blue/red
L/W : Blue/white
L/Y : Blue/yellow
O/B : Orange/black
O/R : Orange/red
O/Y : Orange/yellow
P/B : Pink/black
P/G : Pink/green
P/W : Pink/white
R/B : Red/black
R/Y : Red/yellow
W/B : White/black
W/G : White/green
W/R : White/red
Y/G : Yellow/green

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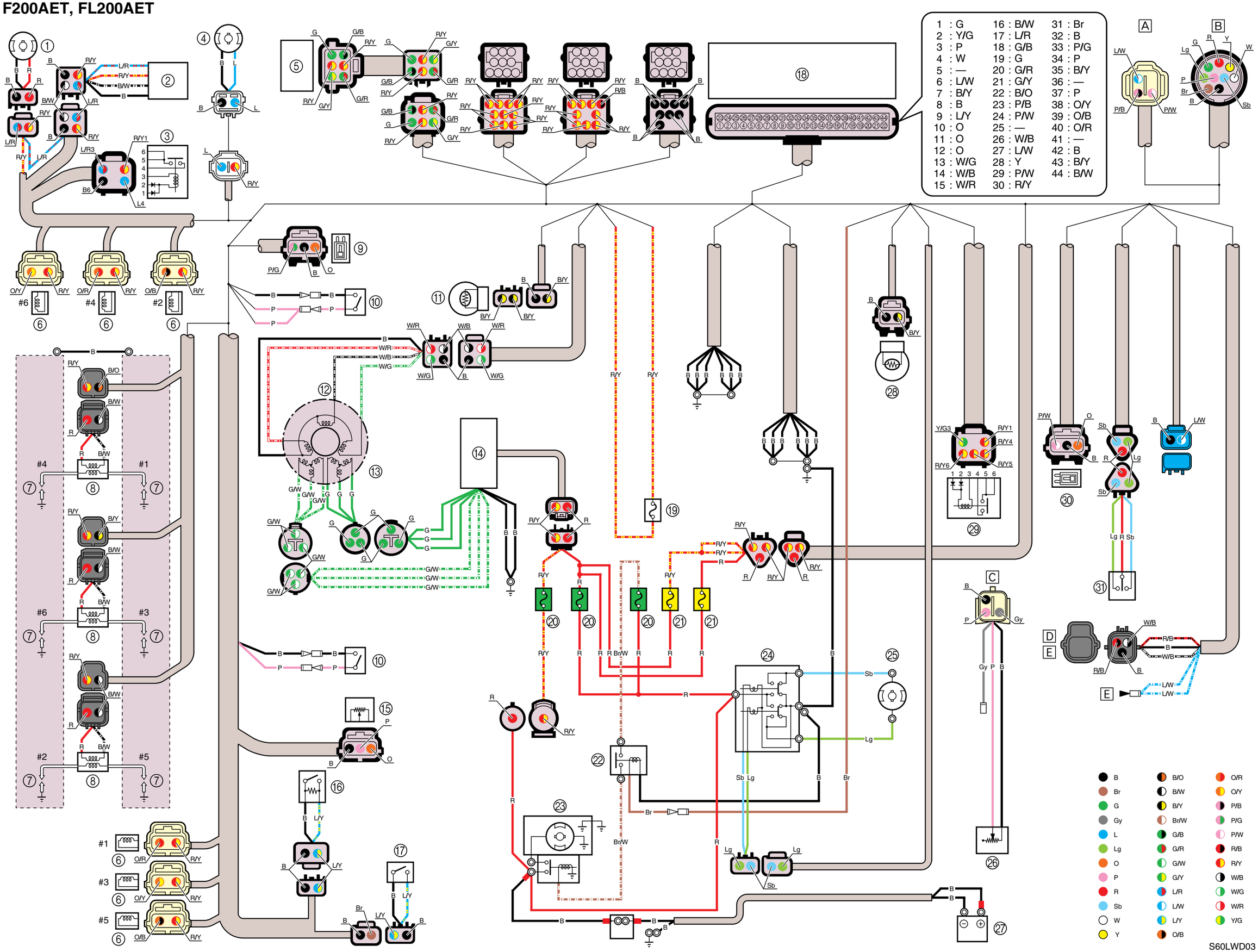
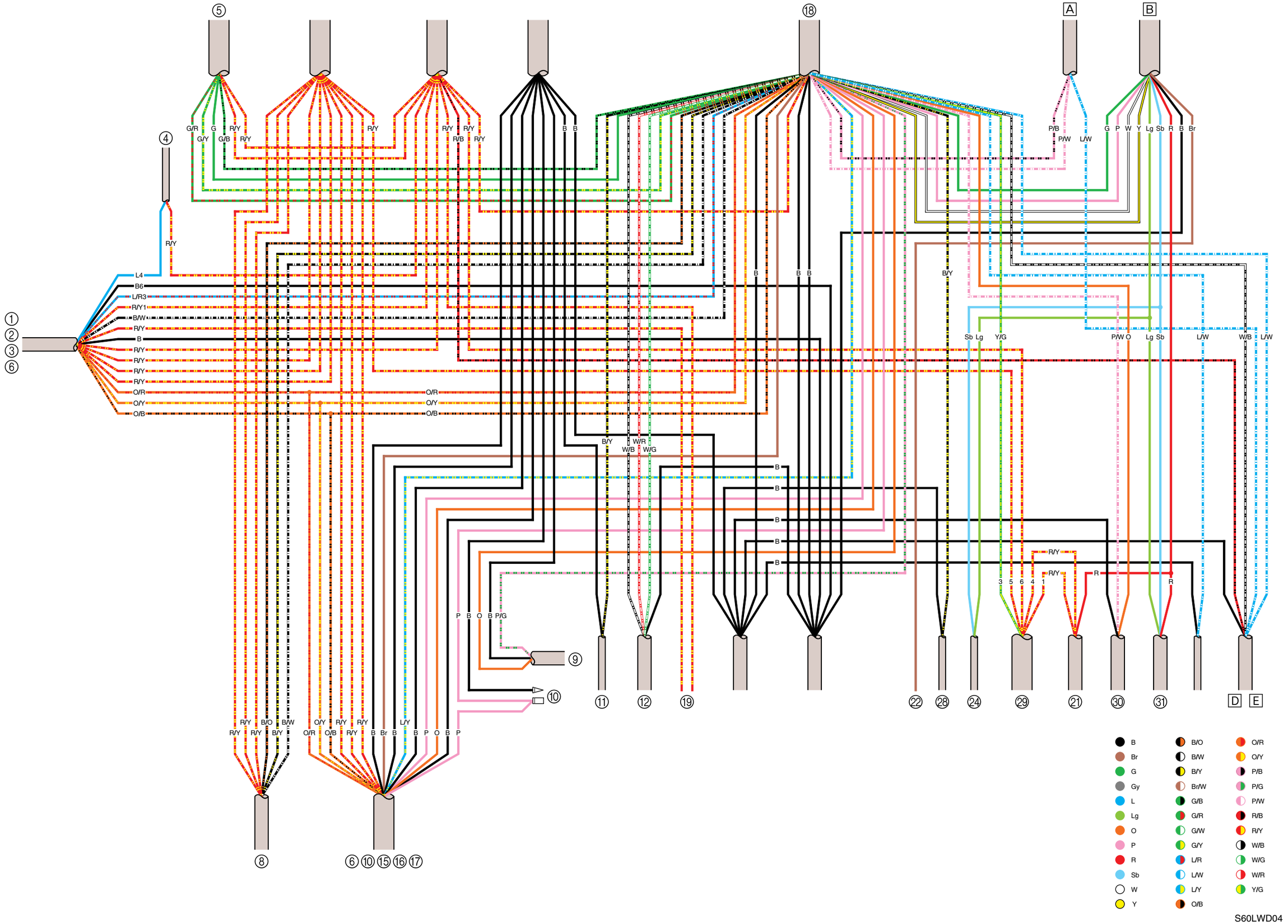
(F200AET, FL200AET)
(E)

F200AET, FL200AET

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